

CLAIMS

1. A piston damper assembly comprising:
 - a) a piston damper including:
 - 5 (1) a damper body;
 - (2) a piston rod which is axially movable within the damper body and which is attachable to a vehicle frame; and
 - (3) a dust tube which circumferentially surrounds at least an axial portion of the damper body and which is attached to the piston rod; and
 - 10 b) a relative velocity sensor including:
 - (1) spaced apart and axially extending first and second magnets which are supported by the dust tube;
 - (2) a flux collector supported by the dust tube, including an axially-extending first prong in axially-extending contact with the first magnet,
 - 15 including an axially-extending second prong in axially-extending contact with the second magnet, and including a joining member connecting the first and second prongs; and
 - (3) spaced apart first and second sensor coils, wherein the first sensor coil surrounds the joining member and/or the first prong and wherein the
 - 20 second sensor coil surrounds the joining member and/or the second prong.
2. The piston damper assembly of claim 1, wherein the piston damper is a magnetorheological damper.
- 25 3. The piston damper assembly of claim 1, wherein the first and second prongs are attached to the inside of the dust tube.
4. The piston damper assembly of claim 3, wherein the first magnet is attached to the first prong and wherein the second magnet is attached to the second
- 30 prong.

5. The piston damper assembly of claim 1, wherein the joining member includes a ring coaxially aligned with the dust tube.
6. The piston damper assembly of claim 5, wherein the first and second prongs
5 and the first and second magnets are substantially aligned along a diameter of the dust tube.
7. The piston damper assembly of claim 6, wherein the first sensor coil surrounds a first circumferential segment of the ring, wherein the second sensor
10 coil surrounds a second circumferential segment of the ring, and wherein a line between the first and second sensor coils is substantially perpendicular to the diameter.
8. The piston damper assembly of claim 6, wherein the first sensor coil
15 surrounds the first prong and wherein the second sensor coil surrounds the second prong.
9. The piston damper assembly of claim 5, wherein the joining member includes a first arm connecting the ring to the first prong and a second arm
20 connecting the ring to the second prong, and wherein the first sensor coil surrounds the first arm and the second sensor coil surrounds the second arm.
10. The piston damper assembly of claim 1, wherein flux collector consists essentially of a ferromagnetic material.
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11. A piston damper assembly comprising:
- a) a piston damper including:
 - (1) a damper body;
 - (2) a piston rod which is axially movable within the damper
30 body; and
 - (3) a dust tube which is attached to the piston rod; and
 - b) a relative velocity sensor including:

(1) an axially extending first magnet which is supported by the dust tube;

(2) a flux collector supported by the dust tube, including an axially-extending first prong in axially-extending proximity with the first magnet, including an axially-extending second prong, and including a joining member connecting the first and second prongs; and

(3) a first sensor coil which surrounds the joining member and/or one of the first and second prongs.

10 12. The piston damper assembly of claim 11, wherein the piston damper is a magnetorheological damper.

13. The piston damper assembly of claim 11, wherein the first prong is attached to the inside of the dust tube.

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14. The piston damper assembly of claim 3, wherein the first magnet is attached to the first prong.

15. The piston damper assembly of claim 11, wherein flux collector consists essentially of a ferromagnetic material.

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16. A piston-damper dust tube subassembly comprising:

a) an axially-extending piston-damper dust tube; and

b) a relative velocity sensor including:

25 (1) an axially extending first magnet which is supported by the dust tube;

(2) a flux collector supported by the dust tube, including an axially-extending first prong in axially-extending proximity with the first magnet, including an axially-extending second prong, and including a joining member connecting the first and second prongs; and

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(3) a first sensor coil which surrounds the joining member and/or one of the first and second prongs.

17. The piston damper assembly of claim 16, wherein the piston damper is a magnetorheological damper.

5 18. The piston damper assembly of claim 16, wherein the first prong is attached to the inside of the dust tube.

19. The piston damper assembly of claim 18, wherein the first magnet is attached to the first prong.

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20. The piston damper assembly of claim 16, wherein flux collector consists essentially of a ferromagnetic material collector.